

26. In a vertical turbine pump incorporating a pump bowl assembly including a casing having a bulbous diffuser section between axially opposed upstream and downstream sections which are narrower than said diffuser section, a bulbous diffuser core disposed centrally in said casing diffuser section, a drive shaft extending centrally and axially through said diffuser core and a rotary impeller fastened to an end of said drive shaft and disposed in said casing upstream section adjacent a fluid inlet, the improvement comprising:

a bearing cartridge separately fastened within said diffuser core;

said bearing cartridge carrying axially spaced bearings which surround and rotatably support said drive shaft,

said bearing cartridge comprising a tubular housing surrounding said drive shaft, and said bearings being fixed within said tubular housing,

said tubular housing being fastened to a tubular adapter which surrounds said drive shaft and axially abuts an end surface of said diffuser core which faces downstream.--

REMARKS

Claims 1-17, 19-22, and 24-26 are pending in the present reissue application. Claims 18 and 23 have been cancelled. This Amendment adds new claims 25 and 26. As indicated by the above

underlining, claims 15, 16, 17, 19, 20, 21, 22, 24, 25 and 26 are added with respect to the original patent, thus the entirety of these claims has been underlined.

EXAMINER INTERVIEW

Patentees appreciate the courtesies extended during the interview conducted between Primary Examiner, Christopher Verdier, and patentees' representative, Michael Cammarata, on January 5, 1999. During this interview, claims 1-25 were discussed in relation to UK Patent 257,111; Springer, Ruyak, and Hacker, all references of record. The Examiner's Interview Summary accurately reflects the substance of the discussions conducted during this interview. Although many issues were discussed, no firm agreement was reached.

OBJECTION TO REISSUE OATH/DECLARATION

The Reissue Oath/Declaration filed with the application was held to be defective because it contained a typographical error. Specifically, this Declaration refers to "original names 1-14" as having been reviewed and understood when "original claims 1-14" was appropriate. Patentees submit that this was merely an inadvertent typographical error which has been corrected in the Supplemental Reissue Oath/Declaration filed concurrently herewith. In view of this correction in the Supplemental Reissue

Oath/Declaration, patentees respectfully request reconsideration and withdrawal of the objection thereto.

RECAPTURE DOCTRINE REJECTION

Claims 15-24 are rejected under the Recapture Doctrine. This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

Although it is true that patentees rewrote independent claim 1 to include the allowable features of dependent claim 4 in the original patent application to obtain allowability of claim 1, it is not true that patentees surrendered the features of claim 4 to secure the patent. Quite to the contrary, it is the features of original claim 1 which were surrendered and not the features of claim 4 as apparently assumed in the Office Action. This argument is fully supported by, for example, In re Byers, 109 USPQ 53, 55 (CCPA 1956) stating in relevant part that

"original claim 20 was amended by substituting 'coplanar' for a flat and by including a further limitation that the cavity was approximately one-third of the diameter of the base and, as so amended, it was allowed. While claim 20 was not technically cancelled, the amendment of that claim by the inclusion of an additional limitation had exactly the same effect as if the claim as originally presented had been cancelled and replaced by a new claim including that limitation."

Therefore, broadening the features of the bearing cartridge (the feature of original claim 4) does not run afoul of the

Recapture Doctrine. Indeed, patentees never cancelled the features of claim 4. Thus, there can be no recapture of such subject matter (the bearing cartridge) because this bearing cartridge feature was never cancelled in the original patent application.

In re Clement, 45 UPSQ2d 1161, 1163, further supports these arguments because patentees are not seeking to broaden the patent in a manner directly pertinent to subject matter that was deliberately surrendered to overcome prior art rejections. Indeed, claim 4 was never surrendered and any broadening thereof that may occur in claims 15-24 has no relevance to the Recapture Doctrine.

In this regard, patentees note that the statements made in the Examiner's reasons for allowance are certainly not rejections. In any event, there was no surrender or other cancellation of the bearing cartridge feature in the original application and patentees are permitted to broaden this feature in this reissue application.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of the Recapture Doctrine rejection.

35 U.S.C. § 251 NEW MATTER REJECTION

Claims 16 and 21 are rejected under 35 U.S.C. § 251 as being allegedly based upon new matter added to the patent for which reissue is sought. This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

The Office Action argues that claims 16 and 21 are not supported by the specification because the term "active" is not well-defined in the claim; thus, reciting that the impeller is the only active element removed to permit removal of the bearing is incorrect because the suction bell and retaining ring must also be removed.

In response, patentees have more clearly defined the term "active" directly in claims 16 and 21 as referring to an element that is actively rotated or otherwise actively moved by the drive shaft when the vertical turbine pump is on. While it is true that inactive elements. (suction bell and retaining ring) must be removed in order to permit removal of the bearing, these elements are clearly inactive elements not falling within the definition of "active element", particularly as this term is specifically defined in claims 16 and 21.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of this § 251 rejection.

35 U.S.C. § 112, FIRST PARAGRAPH

Claims 16 and 21 are rejected under 35 U.S.C. § 112, first paragraph, for essentially the same reasons as the § 251 rejection. This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

Patentees respectfully submit that the above amendments and arguments fully address both the § 251 and this § 112, first paragraph rejection. The further definition of the term "active element" directly in claims 16 and 21 renders this rejection moot.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of this § 112, first paragraph rejection.

35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

Claims 15-24 are rejected under 35 U.S.C. § 112, second paragraph. This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

In regards to claim 15, the term "readily" is objected to as being indefinite. This term has been removed from claim 15 thereby rendering this rejection moot.

The rejection of claims 16 and 21 is substantially related to the § 251 and § 112, first paragraph rejections that are fully addressed above. In view of the above amendments and

arguments, the rejection of claims 16 and 21 is also rendered moot.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of this § 112, second paragraph rejection.

35 U.S.C. § 103 UK-SPRINGER REJECTION

Claims 1-4, 6-7, and 14 are rejected under 35 U.S.C. § 103 as being unpatentable over United Kingdom Patent No. 257,111 (hereinafter UK) in view of Springer (U.S. Patent No. 3,170,646, hereinafter Springer). This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

First of all, the Office Action admits that UK does not disclose a bearing cartridge. Springer, specifically Fig. 11, (Fig. 12 is cited in the Office Action, but this appears to be a typo as confirmed during the interview) is applied to teach a hollow tubular support member 300 that allegedly meets the claimed bearing cartridge. The Office Action concludes that it would have been obvious to replace the bearing assembly 5 of UK with the hollow tubular support member 300 having bearings 299 taught by Springer.

First of all, Springer's pump is a radial flow pump quite distinct from the vertical turbine pump of the invention and UK. The differing construction and operation of such a radial flow

pump provides sufficient reason for making Springer not combinable with UK as suggested by the Office Action. In other words, there is no motivation to combine the disparate teachings of a radial flow pump with a vertical turbine pump. This argument is expanded upon below.

Furthermore, Springer's bearings 299 within hollow tubular support member 300 are elements quite distinct from the bearing cartridge recited in claims 1 and 6, particularly as amended. More specifically, claims 1 and 6 recite that the bearing cartridge is separably fastened within the diffuser core. Springer has no such diffuser core and cannot teach or suggest disposing a bearing cartridge in a diffuser core.

Furthermore, Springer's hollow tubular support member 300 carrying bearings 299 is not removable from an upstream direction of the pump casing. Indeed, in reference to Fig. 11 of Springer, the flow proceeds from intake pipe 266 (the upstream direction) passed impeller 252 and through discharge pipe 232. As further shown in Fig. 11, the hollow tubular support member 300 may be removed from Springer's pump, but this removal is clearly from a downstream direction.

Furthermore, the term "upstream" is further defined in claims 1 and 6 as being an upstream section of the casing. Because Springer's axial flow pump does not pump the fluid stream through the casing such that there is an upstream section

through which fluid flows, Springer is incapable of teaching or suggesting a bearing cartridge removable from an upstream section of the casing.

Still further, claims 1 and 6 have been amended to recite how the bearing cartridge is removable from the upstream section of the casing, specifically by removing the impeller and disengaging the bearing cartridge from the casing thereby permitting the bearing cartridge to be slid off the drive shaft in an axial direction. As shown in Figure 11 of Springer, the hollow tubular support member 300 can be removed by taking off bolts 306. The impeller 252 of Springer is clearly not removed when this hollow tubular support member 300 is taken out. Thus, Springer's hollow tubular support member 300 actually teaches away from the bearing cartridge as further defined in amended claims 1 and 6.

Thus, there are several features clearly absent and not taught or suggested by Springer. Springer's hollow tubular support member 300 is (1) not removable from an upstream direction; (2) specifically not removable from an upstream section of the casing; and (3) not removable by removing the impeller and then disengaging the bearing cartridge from the casing.

Still further, the present invention has certain advantages that are not achieved by Springer or UK, even when combined.

These advantages include the capability to quickly and easily service the bottom bearings of the pump. These bottom bearings, contained in the claimed bearing cartridge, are the first to fail because they are exposed to the fluid being pumped. In traditional vertical turbine pumps, the entire pump assembly must be tore down from the downstream direction in order to access these bottom bearings. The present invention completely avoids such inconvenient and troublesome servicing of these bearings by providing a specially designed bearing cartridge separably fastened within the diffuser core and removable from an upstream section of the casing by removing the impeller and disengaging the bearing cartridge from the casing thereby permitting the bearing cartridge to be slid off the drive shaft in an axial direction. Thus, a single person can easily service the bottom bearings with minimum. Such advantages are certainly not achieved, taught or suggested by Springer or UK, even when combined.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of this § 103 UK-Springer rejection.

35 U.S.C. § 103 UK-SPRINGER-RUYAK REJECTION

Claims 5 and 8-9 are rejected under 35 U.S.C. § 103 as being unpatentable over UK, Springer, and further in view of

Ruyak et al. (U.S. Patent No. 4,487,557, hereinafter Ruyak). This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

The above arguments are hereby incorporated by reference. Patentees respectfully submit that these arguments are sufficient to remove both UK and Springer as valid art against the independent claims 1 and 6. Furthermore, Ruyak does not remedy any of the noted deficiencies in UK or Springer. Therefore, the further combination of Ruyak with UK and Springer fails to disclose or suggest the features of independent claims 1 and 6, and, necessarily, the features of dependent claims 5 and 8-9.

The Office Action alleges that element 56 of Ruyak is a bearing cartridge. This allegation is specifically traversed. As clearly discussed in column 4, lines 9-27, element 56 is a gland nut which can be utilized to adjust the distance between the back face of the impeller in the impeller chamber. According to Ruyak, this distance is critical and substantially affects the performance of the pump. Specifically, gland nut 56 is keyed to the thrust bearing 54. The critical distance can be precisely adjusted by the gland nut 56 carrying the thrust bearing 54. To perform this adjustment, the impeller is removed from the impeller shaft thereby permitting access to the gland nut 56 when adjusting the thrust bearing. Thus, Ruyak clearly discloses

element 56 as an adjustment mechanism for the impeller. Gland nut 56 simply cannot teach or suggest a bearing cartridge as alleged by the Office Action.

Because none of the applied art teaches or suggests the bearing cartridge as recited in independent claims 1 and 6, the combination of these patents must fail to disclose or suggest the inventions recited therein.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of this § 103 UK-Springer-Ruyak rejection.

35 U.S.C. § 103 UK-RUYAK REJECTION

Claims 15-24 are rejected under 35 U.S.C. § 103 as being unpatentable over UK in view of Ruyak. This rejection, insofar as it pertains to the presently pending claims, is respectfully traversed.

All of the above arguments relating to UK and Ruyak are hereby incorporated by reference. Patentees respectfully submit that neither of these patents teaches or suggests the bearing cartridge as recited in independent claims 15 or 20, as argued in detail above. Therefore, the combination of these patents fails to disclose or suggest the inventions as recited in claims 15 and 20.

For all of the above reasons, taken alone or in combination, patentees respectfully request reconsideration and withdrawal of this § 103 UK-Ruyak rejection.

ALLOWABLE SUBJECT MATTER

Patentees appreciate the Examiner's indication that claims 10-13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Newly presented claim 26 is a combination of allowable claim 10 and its antecedent claims 7 and 6. As such, new independent claim 26 is clearly in condition for allowance and patentees respectfully request a formal indication thereof.

CONCLUSION


If the Examiner has any questions concerning this application, the Examiner is requested to contact Michael R. Cammarata at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees

required under 37 C.F.R. §§ 1.16 or 1.17; particularly,
extension of time fees.

Respectfully submitted,

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